REMARKS

I. Objection to the Specification

In the Official Action, the Examiner rejected to the specification because of a minor informality. Applicant has made the correction requested by the Examiner, as well as correcting several other obvious typographical and grammatical errors. No new matter has been added. Accordingly, it is respectfully requested that the objection be withdrawn.

II. Rejection of Claims Under 35 U.S.C. § 103(a)

Claim 1 was rejected under § 103(a) as unpatentable over U.S. Patent No. 5,315,098 to Tow (hereinafter, Tow) in view of U.S. Patent No. 6,000,613 to Hecht et al. (hereinafter, Hecht). According to the Examiner, Tow shows a method of encoding data in an image using 'circularly asymmetric halftone dot patterns'. . . The dot pattern is rendered into a tiled cell block 61, producing a hard copy rendering of the image with digital data encoded thereon. . . Also, the color, size, and pixel density must be predetermined, i.e., they must have particular values selected before a cell can be created/rendered. The Examiner admits that Tow fails to show that the code is invisible and he cites Hecht in an attempt to supply a teaching of this feature. The Examiner states that Hecht shows glyphs made using inks that are virtually invisible under normal lighting conditions. Also, 'small size' can help hide the glyphs. (October 15, 2002 Official Action at page 3.) The Examiner also alleges that:

> it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the old and well-known glyph construction using hard-to-see inks and small size as taught by Hecht into the teachings of Tow because this allows information to be hidden in documents, fighting forgery and foiling those who might attempt to pass fraudulent documents.

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(October 15, 2002 Office Action at page 3.) Applicant disagrees with the Examiner's characterization of the prior art, and for the reasons stated below, traverses the Examiner's rejections.

The present invention, as recited in claim 1, is directed to a method for encoding digital data in a hardcopy rendering of an invisible image defined by at least one circularly asymmetric dot pattern, said method comprising: modulating said dot pattern in accordance with said digital data; and rendering said modulated dot pattern into a tiled halftone cell of predetermined visible color, size and pixel density on a recording medium, thereby producing said hardcopy rendering of the invisible image with said digital data encoded thereon.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be some reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure.

In this case, the prior art references fail to teach or suggest all the claim elements. Specifically, none of the cited prior art teaches, suggests or discloses the capability to at least render a modulated dot pattern into a tiled halftone cell of predetermined visible color, size and pixel density on a recording medium, thereby producing said hardcopy rendering of a digitally data encoded invisible image. If the glyphs disclosed in Tow were printed in yellow instead of gray, the glyphs would still be visible as yellow glyphs because the average density of the halftone rendering disclosed in Tow is too high to render the glyphs invisible.

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Hecht fails to make up for the shortcomings of Tow, and in fact Hecht teaches away from the claimed elements when it provides that ". . . glyphs can be written using inks that are virtually invisible to the human eye under normal lighting conditions," and ". . . glyphs written using visible inks, such as standard xerographic toners, can be of such a small uniform size and written at a sufficiently high spatial density that the resulting glyph code has a generally uniform textured appearance to the human eye." (Hecht at col. 1, line 66 - col. 2, line 3.) In other words, Hecht teaches that glyphs may be written using virtually invisible inks and that glyphs written with visible inks may produce a generally uniform textured appearance. Hecht does not teach the use of visible colors to produce invisible images.

With respect to the rejection of claim 2, the Examiner cites European Patent 0590884B1 to Sasanuma [et al.] (hereinafter Sasanuma) for allegedly "showing that yellow ink under certain circumstances is unnoticeable on white paper." A careful reading of Sasanuma reveals that it fails to teach, disclose or suggest at least the capability to render a modulated dot pattern into a tiled halftone cell of predetermined visible color, size and pixel density on a recording medium, thereby producing a hardcopy rendering of a digitally data encoded invisible image as claimed. Since neither Tow, Hecht nor Sasanuma, taken singly or in any reasonable combination, teaches or suggests the capability to render a modulated dot pattern into a tiled halftone cell of predetermined visible color, size and pixel density on a recording medium, thereby producing said hardcopy rendering of a digitally data encoded invisible image as recited in claim 1, the section 103 rejection is improper. Applicant therefore requests the Examiner to withdraw the rejection of claim 1 under 35 U.S.C. § 103(a) as it is allowable. Applicant also requests the Examiner withdraw the rejection of claims 2-4 as they depend from allowable independent claim 1.

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The Examiner next rejects claims 3 and 4 under 35 U.S.C. § 103(a) as unpatentable over Tow in view of Hecht as applied to claim 1 above, and further in view of U.S. Patent No. 6,250,007 to Mowry, Jr. et al. (hereinafter, Mowry) and U.S. Patent No. 6,076,738 to Bloomberg et al. (hereinafter, Bloomberg). According to the Examiner, Tow/Hecht "fails to show that the size is a 12x12 matrix" and he cites Mowry and Bloomberg for allegedly teaching this feature. As stated above, Tow in view of Hecht does not disclose, teach or suggest the capability to render a modulated dot pattern into a tiled halftone cell of predetermined visible color, size and pixel density on a recording medium, thereby producing said hardcopy rendering of a digitally data encoded invisible image, Mowry and Bloomberg fail to make up for that shortcoming. Therefore, for the same reasons articulated above, Applicants respectfully submit that the withdrawal of the rejection of claims 3 and 4 under 35 U.S.C. § 103(a) is in order as they depend from allowable base claims.

IV. Conclusion

In view of the foregoing, it is submitted that the cited prior art considered separately or in combination fails to teach or suggest the Applicants' invention. Therefore, it is respectfully asserted that the present application is in condition for allowance and a notice to that effect is respectfully requested. However, if the Examiner deems that any issue remains after considering this response, he is invited to call the undersigned to expedite the prosecution and work out any such issue by telephone.

If any extension of time under 37 C.F.R. § 1.136 is required to obtain entry of this response, and not requested by attachment, such extension is hereby requested. If there are any

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fees due under 37 C.F.R. § 1.16 or 1.17 that are not enclosed, including any fees required for an extension of time under 37 C.F.R. § 1.136, please charge those fees to Xerox Deposit Account No. 24-0037.

Respectfully submitted,

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Dated: December 20, 2002

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APPENDIX TO OCTOBER 15, 2002 AMENDMENT

IN THE SPECIFICATION:

Please amend paragraph 4 as follows:

[4] The present invention is directed to systems and methods for embedding information into an image and more particularly to systems and methods for embedding invisible information into an image and [reliable] reliably decoding the information at a later time.

Please amend paragraph 30 as follows:

[30] FIG. 3 illustrates a cell [bock] block 310 in accordance with one embodiment of the present invention. As shown in FIG. 3, cell [bock] block 310 is comprised of a two dimensional array of pixels 320. While not specifically shown, it is intended that halftone cell 210 and cell [bock] block 310 are similarly sized, such that pixel 320 is less than ½ the size of pixel 220. Since the size of the pixels are smaller, [halftone] dot patterns printed using pixels from cell block 310 are much less perceptible than similarly-sized patterns using pixels from cell 210. Moreover, when yellow glyph marks using cell block 310 are printed on a white background at a density of approximately 2%, the pixels are not visible to the naked eye. For example, if each glyph consists of 3 yellow pixels at ± 45°, and each glyph is inside a plain box of size 12 x 12 pixels, the entire glyph block will remain below 2% average yellow, and thus be non-visible to the naked eye. Each yellow glyph is however detectable on a standard quality color scanner (e.g., 400 or 600 s.p.i.) In fact, each glyph mark is about the size of a comma in 2-pt font, and is therefore detectable by any copier that has good image quality.

IN THE CLAIMS:

Please amend claims 1 and 2 as follows:

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1. (Amended) A method for encoding digital data in a hardcopy rendering of an invisible image defined by at least one circularly asymmetric dot pattern, said method comprising:

modulating said dot pattern in accordance with said digital data; and

rendering said modulated dot pattern into a tiled halftone cell of predetermined visible color, size and pixel density on a recording medium, thereby producing said hardcopy rendering of the invisible image with said digital data encoded thereon.

2. (Amended) The method of claim 1, wherein the predetermined visible color is yellow.

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